BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Subsidiary Diploma in Applied Science Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Biomedical Science Pearson BTEC International Level 3 Diploma in Environmental Science Pearson BTEC International Level 3 Extended Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Biomedical Science Pearson BTEC International Level 3 Extended Diploma in Environmental Science
Unit number and title	**Unit 14: Genetics and Genetic engineering**
Learning aim(s) (For NQF only)	**A**: Understand the structure and function of nucleic acids in order to describe gene expression and the process of protein synthesis
Assignment title	**Structure and function of nucleic acids**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are applying to do work experience in a molecular biology laboratory. As part of the application process you have been asked to produce an illustrative report to demonstrate your understanding of DNA, RNA and protein synthesis and the consequences of error occurring in protein synthesis.

Task	Produce an illustrated report that **assesses** the impact of error in the stages of protein synthesis, **discusses** the functional role of nucleic acids in the stages of protein synthesis and **explains** the structure and function of nucleic acids: **Explain** the nucleotide structure and main features of the following nucleic acids: • **DNA –** stages and enzymes involved in DNA replication • **RNA –** mRNA, tRNA, rRNA, siRNA **Discuss** the functional role of these nucleic acids in protein

	synthesis and the locations of each stage involved in protein synthesis. **Discuss** how the genetic code allows proteins to be synthesised with minimal errors taking place, including: • triplet codes • codon • anticodon • degenerate code • non-overlapping **Assess** the possibility of errors occurring during the stages of protein synthesis, particularly during transcription and translation. Analyse the cause and effect of genetic mutations in DNA, including: • Missense • Nonsense • Silent • Insertion • Deletion • Duplication • Frameshift • The role of mutagenic agents such as irradiation and chemical mutagens Provide examples of the impact that these errors may have on the end products of protein synthesis. Scientific terminology must be used accurately throughout your report. You are encouraged to include photographs of models, images or diagrams where appropriate, and reference your sources.
Checklist of evidence required	An illustrative report that includes: • Assessment of the consequences of error during protein synthesis • Discussion about protein synthesis and the role of nucleic acids • Explanation of the structure and function of DNA and RNA
Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
A.D1	Assess the impact of error in the stages of protein synthesis.
A.M1	Discuss the functional role of nucleic acids in DNA in the stages of protein synthesis.
A.P1	Explain the structure and function of DNA and various nucleic acids.

Sources of information to support you with this Assignment	https://www.youtube.com/watch?v=gG7uCskUOrA http://www.nature.com/scitable/topicpage/discovery-of-dna-structure-and-function-watson-397 http://www.scienceprofonline.com/genetics/ribonucleic-acid-rna-structure-and-function.html http://www.livescience.com/37247-dna.html https://www.ncbi.nlm.nih.gov/books/NBK26821/ https://www.thebalance.com/what-is-sirna-and-how-is-it-used-375598 https://highered.mheducation.com/sites/9834092339/student_view0/chapter15/protein_synthesis.html https://ghr.nlm.nih.gov/primer/mutationsanddisorders/possiblemutations Above are some examples of websites. Further useful resources may be found at: http://qualifications.pearson.com/en/support/published-resources.html#step1